WHAT IS CLAIMED IS:

1. A temperature-sensing device for use in protecting a heat-generating power device from an over-temperature condition comprises:

a semiconductor substrate having a first surface, a second surface opposite of the first surface and a diode structure;

a cathode and an anode electrically coupled to the diode structure and disposed on the first surface of the semiconductor substrate, wherein the diode structure is temperature sensitive such that a change in temperature of the diode structure causes a predictable change in the voltage drop across the anode and the cathode while a constant forward bias current is applied;

a dielectric layer formed on the second surface of the semiconductor substrate such that the second surface of the semiconductor substrate is electrically isolated; and

a metallization layer formed on the dielectric layer such that the metallization layer is bound to the dielectric and is attachable to a conductive or semiconductive substrate.

2. The device of claim 1, wherein the diode structure is a Schottky diode structure or a PIN rectifier diode structure.

3. The device of claim 2, wherein the diode structure is a Schottky diode structure.

4. The device of claim 1, wherein the dielectric layer has a thickness and the thickness is selected in a range from at least 5000 Angstroms to no greater than 8000 Angstroms.

5. The device of claim 4, wherein the dielectric layer isolates the semiconductor substrate from voltage spikes of about 500 Volts.

6. The device of claim 1, wherein the metallization layer is solderable.

7. The device of claim 5, wherein the metallization layer is comprised of a layer titanium formed on the dielectric layer, a layer of nickel formed on the titanium layer and an oxidation resistant layer formed on the layer of nickel.

8. The device of claim 6, wherein the oxidation resistant layer is of silver.

9. The device of claim 6, wherein the metallization layer further comprises a layer of an aluminum formed on the oxidation resistant layer.

10. The device of claim 1, further comprising:

a constant forward bias current and operational amplifier circuit coupled to the anode and the cathode of the semiconductor die, wherein a constant forward bias current is applied to the semiconductor die and a voltage drop across the semiconductor die is amplified such that an amplified voltage from the amplifier circuit indicates a measurable change in the voltage drop with a measurable change in temperature of the semiconductor die.

11. The device of claim 9, wherein the diode structure is a Schottky diode structure or a PIN rectifier diode structure.

12. The device of claim 10, wherein the diode structure is a Schottky diode structure.

13. The device of claim 9, wherein the dielectric layer has a thickness and the thickness is selected in a range from at least 5000 Angstroms to no greater than 8000 Angstroms.

14. The device of claim 4, wherein the dielectric layer isolates the semiconductor substrate from voltage spikes of about 500 Volts.

15. The device of claim 9, wherein the metallization layer is solderable.

16. The device of claim 13, wherein the metallization layer is comprised of a layer titanium formed on the dielectric layer, a layer of nickel formed on the titanium layer and an oxidation resistant layer formed on the layer of nickel.

17. The device of claim 14, wherein the oxidation resistant layer is of silver.

18. The device of claim 14, wherein the metallization layer further comprises a layer of an aluminum formed on the oxidation resistant layer.

19. The device of claim 1, wherein the semiconductor die is capable of being positioned in close proximity to the heat-generating power device.

20. The device of claim 17, wherein the heat-generating power device is a power MOSFET and the metallization layer is soldered to the same conductive substrate as the power MOSFET.